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# Calibrating Drills and Broadcast Planters for Small-Seeded Forages

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Planting drills and broadcast seeders must be calibrated to ensure the proper seeding rate of small-seeded forages. With the high seed cost of new varieties, planting rate accuracy is an economically important task. The meter setting chart provided by the machine manufacturer may or may not be accurate for small-seeded forages, depending on drill wear or condition. Even new machines set at the recommended seed meter setting may not be precise enough to deliver the proper seeding rates of small-seeded legumes or grasses. In some demonstrations, the meter setting on certain drills had to be set at zero to achieve the recommended seeding rate of 2 pounds per acre for white clover.

It is important to check drill or broadcast seeder components to be sure parts are working properly, especially on rental machines. In rental drills, it is not uncommon to find obstructions in seed tubes such as spider webs or old seed from a previous use. Check all seed tubes to make sure they are clear and allow seed to drop through.

**Figure 1. Seed tube on left plugged with old seed from a previous use and tube on right plugged with a spider web. All seed tubes should be checked for obstructions before each use to avoid skipped rows resulting from plugged tubes.**

Various methods may be used for planter calibration, but two factors must be known – the area covered and the amount of seed used. This guide will cover basic methods for calibrating drill and broadcast seeders.

## Equipment Needed

- 3-4 buckets to catch seed
- Tarp or sheet of plastic
- Cup or container to weigh seed
- Gram or ounce scale
- Calculator
- Stopwatch

## Calibrating Drill Planters

### Amount-of-Seed-Used Method

This method can be used to calibrate the drill before entering the field. Become familiar with the calibration mechanism on the drill before starting the calibration procedure. Some no-till drills have a single control meter for adjusting the seed flow from the seed box. Others have two control meters, one for each side of the seed box. In that case, the seed flow must be checked for both sides of the seed box. Because of equipment wear or uneven adjustment, it is common for each control meter to have a slightly different setting to deliver the same rate of seed.

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**Equation 1.1**

$$\frac{\text{43,560 sq ft per acre}}{\text{drill width} \times \text{drive wheel circumference} \times 100} = \text{number rounds of drive wheel for 1/100 acre}$$

**Steps**

1. Raise drill off ground (block it for safety).
2. Measure circumference of drive wheel and determine drill width.
3. Calculate the number of rounds of the drive wheel needed for 1/100 acre using Equation 1.1.
4. Place tarp or plastic under drill to catch any spilled seed.
5. Add a small amount of seed to the seed box, and turn the drive wheel until seed is dropping from each tube. Check each tube for obstructions to ensure proper seed flow.
6. Pull the ends of the seed tubes from the row openers, and put the ends in buckets to catch seed. Three to four buckets are usually sufficient to catch seed from all drill tubes.
7. Mark a reference point on the drive wheel with tape or chalk, and turn the wheel the number of rounds previously calculated with Equation 1.1.
8. Collect the seed in buckets while turning the drive wheel.
9. When the drive wheel has been turned the proper number of turns, combine the seed from each bucket and weigh the seed.
10. Use the following equations to determine seeding rate at the setting used.

**Equation 1.2**
If the seed weight is in ounces:

$$\frac{\text{seed weight (oz)} \times 100}{\text{16 oz per lb}} = \text{lb/acre}$$

**Equation 1.3**
If the seed weight is in grams:

$$\frac{\text{seed weight (g)} \times 100}{\text{454.4 g per lb}} = \text{lb/acre}$$

**Values used in Equations 1.1, 1.2 and 1.3**

43,560 = the number of square feet in one acre
16 = the number of ounces in one pound
454.4 = the number of grams in one pound

**Example:**

1. A drill has a width of 7' and a drive wheel circumference of 4.3'.

   The number of turns to turn the drive wheel to cover 1/100 acre is calculated as follows:

   $$\frac{43{,}560}{7 \times 4.3 \times 100} = \text{14.5 turns of the drive wheel to cover 1/100 acre}$$

2. The amount of seed collected during the 14.5 turns of the drive wheel was 88 grams. To determine the seeding rate per acre at this setting, use Equation 1.3 because the seed was weighed in grams.

   $$\frac{88 \text{ g} \times 100}{\text{454.4 g per lb}} = \text{19.3 lb/acre}$$

## Steps to Calibrate a Broadcast Seeder

Calibrating a broadcast seeder is a simple process and is very similar to calibrating a field sprayer. The spreading width and driving speed must be measured first. The following procedure provides a step-by-step method for accurate calibration of broadcast spreaders whether on a tractor or an ATV.

1. Determine the spreading width of the seeder for the type of seed to be planted. Different types of seed flow differently and have differing spreading ballistics, so the spreading width should be checked for different seed types. To determine the spreading width, select an area in a barn or location protected from the wind and lay out a clean wide tarp behind the tractor or ATV to catch seed. Add a small amount of seed to the spreader, and set the gate opening to the desired setting. Keeping the unit stationary, turn on the spreader for several seconds at the rpm or spinner speed to be used in the field and measure the outer limit of where seed lands on the tarp. **NOTE: For safety, make sure to remain clear of the spreader and spinner during this step.**

   To determine uniformity of the spreading pattern, lay out several small pans on the tarp to catch seed. Arrange the pans in a

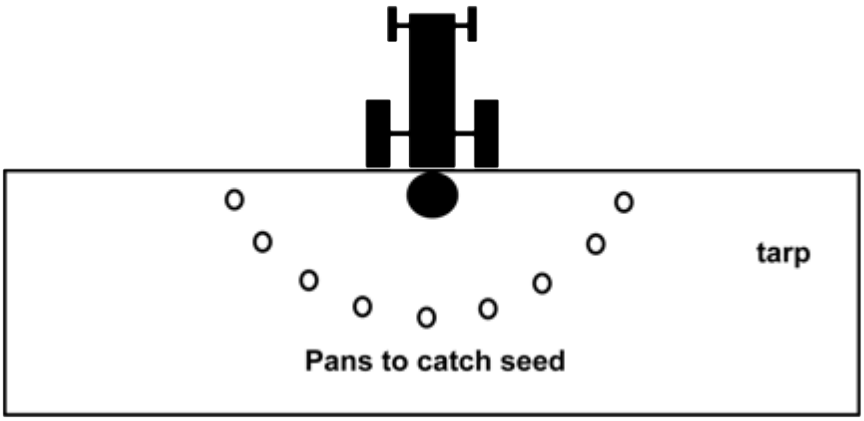


**Figure 2. Arrangement for determining spreading pattern uniformity for a broadcast seeder.**

semicircle pattern across the width of the spreading pattern as shown in Figure 2. Including a cloth or paper towel in the pans will help prevent seed from bouncing out. If the amount of seed for each side of the spreading pattern is not uniform, adjust according to the manufacturer's directions.

2. After measuring the spreading width, calculate the spreading distance needed to cover 0.1 acre. One acre is 43,560 square feet. An area of 0.1 acre is 4,356 square feet. Divide the area of 0.1 acre by the spreading width to get the distance needed to travel for 0.1 acre.

**Equation 1.4**
To determine spreading distance for 0.1 acre:

$$\frac{4{,}356}{\text{spreading width}} = \text{distance needed to cover 0.1 acre}$$

**Example:** If the spreading width is 20 feet, dividing 4,356 by 20 gives the distance to travel 218 feet.

3. Determine the driving speed. Mark off the distance calculated in Step 2 in the field or area of similar terrain. Drive the unit along the measured course at the intended spreading speed and record the time needed to cover that distance. Drive the course multiple times to get an average speed.

4. Return to the area with the tarp. Clean off the tarp and add seed to the spreader. Turn on the spreader for the same length of time needed to drive the marked distance. Make sure the spreader is at the same pto speed or spreader setting used during the speed check. Catch the seed on the tarp, then gather the corners of the tarp and pour the seed into a bucket. Hold down the middle of the tarp while gathering the seed to prevent wind from billowing the tarp and spilling seed. Weigh the seed and use Equation 1.5, 1.6 or 1.7 to convert the seed weight to an acre basis. Adjust the spreader gate opening or driving speed as needed to change the seeding rate.

**Equation 1.5**
If the seed weight is in pounds:

$$\text{seed weight (lb)} \times 10 = \text{pounds of seed spread per acre}$$

**Example:** If the average driving time to cover 0.1 acre is 30 seconds and the amount of seed caught in 30 seconds is 2.2 lb, the seeding rate would be $2.2 \times 10 = 22$ lb per acre.

**Equation 1.6**
If the seed weight is in ounces:

$$\frac{\text{seed weight (oz)} \times 10}{\text{16 oz per lb}} = \text{pounds of seed spread per acre}$$

**Example:** If the average driving time to cover 0.1 acre is 30 seconds and the amount of seed caught in 30 seconds is 12 ounces, the seeding rate would be $(12 \times 10)/16 = 7.5$ lb per acre.

**Equation 1.7**
If the seed weight is in grams:

$$\frac{\text{seed weight (g)} \times 10}{\text{454.4 g per lb}} = \text{pounds of seed spread per acre}$$

**Example:** If the average driving time to cover 0.1 acre is 30 seconds and the amount of seed caught in 30 seconds is 150 grams, the seeding rate would be $(150 \times 10)/454.4 = 3.3$ lb per acre.

## Seeding Depth

Calibrating the drill for seeding rate is important, but proper seeding depth is also critical for small-seeded forages. Planting seed too deeply is the cause of many planting failures each year. Small-seeded forages such as clovers, bermudagrass and ryegrass should be planted about ¼ inch or less. Planting small seeds 1 inch or more deep can result in poor emergence and poor stands.

After calibrating the drill, plant test strips to determine the depth at which seed is being planted. Small seeds are difficult to see in the row. A small amount of seed can be spray painted bright orange and allowed to dry thoroughly, mixed with plain seed and placed in the drill seed box immediately above each seed outlet. The colored seed is easily seen in the row. (**Note:** Make sure the painted seed has dried completely before putting it in the drill. Otherwise it will clump together and will not flow out of the drill.) Once seed placement depth has been determined, the machine can be adjusted as needed according to the manufacturer's instructions.

**Figure 3. A small amount of painted seed added to the seed box can help determine seeding depth.**

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